PATHFINDER

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An informal newsletter produced for the GPS user community by Army PM GPS, Fort Monmouth, NJ. Information presented is based on published and submitted news items of interest to the general user. Widest dissemination and reproduction is encouraged. Newsworthy items are solicited for inclusion. Editor Mr. Don Mulligan at PM GPS, Ft Monmouth NJ DSN 992-6137 or (732) 532-6137 or email: **Donald.Mulligan@mail1.monmouth.army.mil**

The PATHFINDER can be found online at: http://army-gps.robins.af.mil

PM's Corner:

Hello GPS Users!

As you can read in the following article, GPS played a key role in the success of recent army exercises at Fort Irwin California. When we say "GPS" today it usually means the AN/PSN-11 PLGR handheld GPS receiver but over the next few years, the next generation of GPS receiver technology will begin arriving: The Defense Advanced GPS Receiver (DAGR) will replace the PLGR in many units and a family of embeddable military GPS receivers known as GPS Receiver Applications Modules (GRAM) will be introduced. The GRAM receivers will provide GPS data to a variety of combat and combat support systems like Land Warrior, Joint Tactical Radios and the Movement Tracking System to name a few. The GRAM will be "buried" inside the weapons system computer to provide full-time GPS data doing away with today's cable connection to a separate PLGR.

You may see slick new commercial GPS receivers and ask "why doesn't the Army buy them?" Remember the business you are in: Survival on a lethal battlefield counts! There are critical differences between military receivers that can perform under battlefield EW duress and commercial receivers that cannot. Don't spend unit funds on commercial equipment; besides being an unauthorized expenditure of government funds, you are buying something that cannot be used in a combat mission. Please read the articles about COMSEC codes, Selective Availability and Anti-Jamming presented in the April 2001 issue of Pathfinder, available at the website.

We've been getting lots of calls as a result of articles in this newsletter and PS Magazine. We appreciate the opportunity to clarify GPS policy and answer your questions about receivers, installations and support.

If you have a question, call, write, email or fax us using the "How to contact us" Box!

LTC George D. Eveland

GPS and Army Digitization Move Forward at Fort Irwin

The recent Division Capstone Exercises (DCX) at Fort Irwin CA, provided the largest-ever application of digitization technology to Army combat forces. For those of us that could not attend, reports indicate that the heart of the system, the Force XXI Battle Command Brigade and Below (FBCB2) performed well. A combination of FBCB2 computers, GPS receivers and wireless modems were combined with traditional command and control mechanisms to provide maneuver forces with more information than they've ever had before. The result was not the "information overload" that some feared. Instead, reports indicate that combat crews had real-time information about where they were, where they should go and where the enemy might be located. The information was displayed on touch-screen monitors with three-dimensional digital maps and icons to show their position and that of known friendly and hostile forces. The FBCB2 system also taps into satellite communications and digital map imagery to provide a better view of the moving battlefield than any other combination of past technology. You want proof? The opposing force at Fort Irwin, known as the Red Team, routinely uses its superior knowledge of the local terrain to beat the "visiting team." Not so this time. The Red Team's sharp operating skills were not enough to counter the Blue Team's use of digitization technology. Although some bugs were identified for further work, overall the exercise demonstrated that digitization and FBCB2 provided superior battlefield information. As a result, work to integrate digital technology to the combat force of the future will continue.

This is not to say the soldier is obsolete. Far from it, the real success of digitization is to provide the right information to the soldier, the combat team and the chain of command when and where it is needed. FBCB2 and digitization does that. One example: Very little time was wasted in asking "where am I? Where are you?" since unit positions were right there on the screen. GPS is one part of the digitization effort. It is important that every soldier understands how GPS works and how to compensate for things like terrain blocking or hostile jamming. The US Army Signal Center is currently working to have GPS identified as a critical soldier skill. Think about the negative effect you may suffer if your GPS receiver is not properly keyed with COMSEC to protect you from accidental or hostile jamming and spoofing. Bad positioning data could put you in the wrong place at the wrong time! If you want your battlefield GPS receiver to be accurate 24-7, the only way that's going to happen is by using the military-only encrypted GPS signal.

Based on the success of the exercise at Fort Irwin, the digitization of the Army will continue. Future combat demonstration exercises will grow larger and the number of FBCB2 devices fielded will grow as we move towards the fully digitized battlefield.

For more information about how GPS fits into the Digitization of the Army, review the October 2000 issue of Pathfinder, available at the website.

NIMA is Going Digital in a Big Way

The era of paper maps is drawing to a close. It won't happen overnight but the success of the Army DCX exercises as discussed in the previous article has led officials at the National Imagery and Mapping Agency (NIMA) to begin a $3 billion program that will ultimately replace paper maps with digital maps. A general officer attending the exercise stated that the availability of digital maps for the exercise greatly reduced the need for soldiers to use radios to ask for the locations of themselves, friendly and opposing forces. The historic percentage of radio traffic asking for locations is about 52%. Thanks to the digital maps and the onboard computer communication systems, that was reduced to about 10%. Digital maps and GPS are key elements in the process of integrating legacy systems with digital technology to provide up-to-the-minute information on the battlefield. Although NIMA will begin buying the equipment necessary to convert production to digital maps, they will also retain the ability to produce traditional 1:50,000 map that we have been familiar with for generations. For more information on NIMA,

review the October 2000 issue of Pathfinder at the website!

POC: CPT Jim Pugel at Defense Mapping School, Fort Belvoir VA (703) 805-3605, DSN 655-3605.

Q: What is the difference between SAASM and M Code and why should I care?

Since it gained widespread publicity as a result of Operation Desert Storm, the GPS program has in some way suffered from "too much success." How so? GPS was always intended to be a dual use technology meaning it would be available to civil as well as military users. But no one anticipated the astounding growth in GPS use for personal, government and commercial uses. As a result of that growth (which continues today), some estimates say that 90% of the users are civilians even though the system is still operated and funded by the military. Definitely a great success as a dual use technology because people waste less time finding their way, business is more efficient and in times of emergencies accurate position locations save lives.

The "problem" surfaces when you realize that hostile forces can access the civilian GPS signal just like you or me. Since we don't want them using GPS to accurately target our forces in times of hostilities, we need "something extra" to block that access while simultaneously protecting signal access of our own forces and friendly users. How to do that?

The solution is to provide military users with a battlefield signal protection technology called Selective Availability Anti-Spoof Module (SAASM). No, we can't tell you how it works but accept that fact that with SAASM technology, your GPS receiver will operate with precision on the battlefield despite the EW interferences disrupting the civil signal. SAASM comes on-line over the next few years and is mandatory for future combat operations. PM GPS is coordinating the major effort to modify or replace all GPS receiver equipment to incorporate SAASM technology for combat forces.

So what is M Code? Think of it as the next generation after SAASM along the path to provide the strongest possible protection for authorized military users, one that will survive in the strongest possible atmosphere of signal denial EW. Who said war was going to be clean. In the future, M Code will replace SAASM but don't look for M Code to come on-line for about a decade since it will also require design changes in the next generation of satellites which are only replaced at the rate of 3 or 4 per year.

If you think you have a need to know more about SAASM or M Code, contact our technical office at Los Angeles.

Del Crane at TMD

Q: I've heard the PLGR Maintenance Program is being restructured and we might have to pay to get our PLGR repaired. What's the story?

There is no way to sugar-coat this news: Due to changes in Army funding priorities, CECOM may implement a change to the current PLGR Depot Repair Program. It will only affect "lower priority" Army units, but it is not good news.

Overall the system will continue exactly as it has since PLGR fielding began in 1994. The change will affect only those Army-owned PLGRs with damage judged to be an exclusion-to-warranty and then only those units that fall below the funding cutoff line. "Who is below the funding cut off line?" is the $64,000 question right now. PM GPS is working with CECOM to minimize the effect of this change and the final changes are not set in concrete. Neither is the implementation date.

Our advice TO EVERY ARMY UNIT is simple: Inspect your PLGR inventory and if you have any unserviceable PLGR, NOW IS A GOOD TIME to send them in for repair. Remember that regardless of the warranty expiration date, your PLGR is still eligible for warranty repair at no cost to the unit (other than inbound postage).

In the worst case scenario for the new exclusion maintenance program, PLGR that are deemed to be exclusions to warranty may be set aside and neither repaired nor replaced for an undefined period of time.

The October 2001 issue of Pathfinder will carry an update on this important topic! In the meantime, get your PLGRs repaired

while this service is still “free” to the unit and every PLGR is either repaired or replaced promptly!

POC: Suzanne Reinhard-Smith at RMD.

Additional Part for Plgr Repair

The nut and flat washer that secures the J4 connector on the PLGR has been stock-listed and should be availabe as: Nut, plain, hexagon NSN 5310-01-485-3993. This action was taken so that field users could replace the nut/washer which came up missing after being removed to secure an anti-interferece plate when the PLGR is mounted adjacent to a SINCGARS radio. If room for the plate, you probably have no need for the replacement nut/washer.

Willie Jackson at GFO

PLGR Sustainment Training Resources
Available Soon

For unit training officers, here is some good news to follow-up the review of training materials presented in the April 2001 issue. The GPS Training Working Group recently met to discuss plans for improving “schoolhouse” GPS courses for students attending the Army Signal Center. Immediate action is being taken to provide PLGR operator training in the 31U course. The group also reviewed GPS training materials available to support unit training officers. PM GPS is working on an update of the exportable training package that will contain printed course material and a disk of Power-point slides. A CD is also being produced to provide refresher training on basic PLGR operations and maintenance. The next issue of Pathfinder will carry availability status and ordering information for these items. If you have a question or comment on training materials, contact Mr. Willie Jackson at the Georgia office or Mr. Don Mulligan at the Fort Monmouth office.

Willie Jackson at GFO

Publication Notice: PLGR Technical Manual and PLGR Soldier's Guide.

The CECOM Technical Publications Office is preparing an updated PLGR Electronic Technical Manual (ETM), dated 1 April 2001. This is a new printing of the TM and includes all prior updates as well as new revisions to the Authorized Accessory List (AAL), the Parts List, etc. The PLGR TM is scheduled for printing in July 2001 (both PDF and hard copies).

Registered Army users on pinpoint distribution will receive hard copies automatically. Check with your publications officer to make sure YOUR UNIT is a registered user for PLGR! The TM number is TM 11-5825-291-13. The USAF TO number is TO-31R4-2PSN11-1.

Also, we discovered that the current PLGR Soldier's Guide, dated July 1997 was never sent to the Army printing office. Corrective action has been taken and requisitions received after August 2001 should receive the complete current copy.

These and other GPS-related publications can be downloaded from the Army Logistics Support Activity website at www.logsa.army.mil. A password is required. You can apply for one at the website.

Ed McAuley at RMD

Q: Who do we contact to get a PLGR installation kit for our vehicle?

The correct installation of PLGR in a ground vehicle provides positional data and timing synchronization for other onboard systems. Incorrect installations can damage the PLGR and or the connected weapons/communication system. A correct installation is greatly preferred!

The last three issues of Pathfinder outlined the essential steps in the process of installing PLGR to the typical ground

vehicle. These issue also contained advice on how to obtain installation kits for the HMMWV, the most popular host vehicle. PM GPS has never sponsored official installation kits for any vehicles. Rather we provided common installation accessories, first during fielding, and now as stock items you can requisition. You can use those common installation items (PLGR power cable, remote antenna and cable, data cable and mounting bracket) along with vehicle-specific components identified by the vehicle platform manager to provide a good PLGR installation. Since there are so many types and variations of vehicles, it is not practical for PM GPS to maintain a warehouse of kits for each. PM GPS will also provide technical advice to anyone requesting it. If you don't have the Oct 2000, Jan 2001 or Apr 2001 issues of Pathfinder, you can find them at the website. If you can't get all the answers you need from the host platform manager, contact one of the PM GPS offices and we will help you.

By the way, as a result of the digitization exercises at Fort Irwin, PM GPS is working to develop a low-cost modification of the basic PLGR installation mount to provide a cut-off switch that kills power to the front end of the power cable when it is disconnected from the PLGR. This will resolve one of the most frequent sources of shorting – which occurs when the PLGR is removed from the vehicle and the "live" power cable dangles, making metal-to-metal contact. Look for definitive information on the availability of this modified mount in the next issue of Pathfinder.

Remember the consequences of an incorrect PLGR installation: Damage to the PLGR and or the computer that you were trying to connect it to. Do it right the first time!

Michael Wilkin (RMD)
and Chuck Pocher (TMD)

GPS For Non-Modernized Aircraft

If your unit operates the UH-1H/V, AH-1 or OH-58A+/C aircraft which are collectively known as Non-Modernized aircraft, your aircraft should be equipped with either the AN/ASN-169 Standalone Air GPS Receiver (SAGR) or the AN/ASN-175 Cargo Utility GPS Receiver (CUGR) to provide GPS capability to the flight crew. PM GPS is currently scrubbing the distribution of the SAGR and CUGR systems to ensure that all aircraft designated for this equipment have received it. If you have questions, call Joe Meskill about SAGR or Don Mulligan for information about CUGR. See the "how to contact us" box for their numbers.

Got Good Software?

For most Army users, your PLGR should display one of the following software versions when powered up: 613-9854-**003** or 613-9544-**008**. There are a few authorized exceptions such as software version 613-9868-**005** used by Special Forces. If your PLGR displays any other software version number, contact a PM GPS office as you most likely need to reprogram your PLGR. We estimate that about 22% of Army PLGRs still do not have the latest version software.

Why bother reprogramming? Because the software upgrade fixes a sneaky anomaly that affects PLGR when it is connected to external power. You may think your PLGR is operating correctly but the anomaly generates errors in the reported position and time, ranging from 10 meters to as much as 300 kilometers. It also affects timing accuracy. The "sneaky" part of the anomaly is that the PLGR will still indicate it is providing accurate information when it is really not. At some point, the receiver will "self-correct" and display an accurate position but then the anomaly starts all over. So, if you haven't reprogrammed your PLGR, you should do so!

PM GPS is obligated to track and report the number of Army PLGRs reprogrammed so if you did not report the serial numbers of your PLGRs after reprogramming, please provide a list of the numbers to Darlene at 732-532-8406, DSN 992-8406, or fax 732-532-6299. You can also reply by email Darlene.Phillips@mail1.monmouth.army.mil

Frank Rowe at GFO

BA-5800 Battery is Back in Stock!

After over two years of backlog status, CECOM has finally pulled ahead of demand and once again has stock on the shelf to fill your requisition for the BA-5800 main power cell. The BA-5800 is designated as the preferred battery for PLGR missions because of its operating duration and ability to function under extreme temperature conditions. For training purposes, many users have gone with a cheaper alternative: The AA battery sleeve and 8 AA cell batteries. (Don't confuse "regular" AA batteries with the special AA size 3.6V memory battery!)

Since many units like to maintain a contingency stock of BA-5800 for deployment, it is nice to know the battery is again available. The CECOM Power Sources Team continues work on a new family of rechargeable batteries including one that will substitute for the BA-5800. This new system will present another option for portable PLGR power and it is projected to be introduced sometime next year. Another popular option available now is the use of external power when the PLGR is vehicle mounted. The last two issues of Pathfinder carried a lot of information about installing PLGRs to vehicles.

Michael Wilkin at RMD

The Magnitude 6.7 Earthquake that no one Noticed!

The recent movement of the earth's crust in Washington state and British Columbia went unnoticed because it occurred in millimeters over approximately 17 days. If it had occurred all at once it would have registered as a magnitude 6.7 earthquake with perhaps hundreds of millions of dollars damage! As it was, no one seemed to notice except for the GPS-aided seismic equipment that continuously monitors surface motion in the region. This is one of the many applications of GPS that benefits the civil population, in peace and times of crisis.

Army Depot Does It's Part to Keep B-1B Bombers On Track.

Tobyhanna Army Depot electronics technicians are currently rebuilding the antenna electronics circuitry to correct misaligned current sensor units in the Miniaturized Airborne GPS Receiver (MAGR). The MAGR is used in many front-line Navy and Air Force aircraft to provide GPS positioning and timing data to maintain precision navigation capabilities. The Army depot at Tobyhanna won the contract to provide depot support for the MAGR system even though very few MAGRs are used by Army aircraft. Recently, while testing MAGRs for the 28th Bomb Wing, Tobyhanna technicians discovered a problem with the alignment procedure in the receiver antenna electronics circuitry. The Tobyhanna team makes the necessary adjustments and tests to confirm the MAGR is performing to spec before returning it to the owning unit. This should ensure that the MAGR continues to play its role in keeping the B-1B bomber on track! Tobyhanna expects to remain the MAGR depot for the next generation MAGR which will incorporate SAASM technology (see article on SAASM elsewhere in this issue).

For more information about Tobyhanna support for the Joint service MAGR Program, contact Mr. Anthony Ricchiazzi at Tobyhanna, DSN 795-7557.

Correction to January 2001 issue:

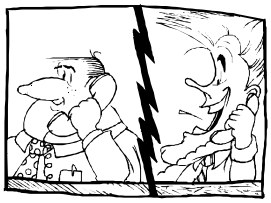
The NSN for the heavy duty commercial carrying case for PLGR was incorrectly identified. The correct NSN is 6760-01-379-3139.

Michael Wilkin

Distribution of the Pathfinder

With every mailing of this newsletter, we get a certain number returned because postal employees at some locations are enforcing a "complete delivery address" requirement or the time period during which they forward mail to a new address has expired. In any case, the reader doesn't get their copy. Without an acceptable mail delivery address we obviously cannot contact you for a correction so please keep us informed of your address changes. If you know someone who is not getting their

copy anymore, tell them to submit a new "complete" mailing address via the website.



How to Contact PM GPS

For PM GPS and the Technical Management Division (TMD) at Los Angeles, CA call (310) 363-0595 or DSN 833-0595. Email: del.crane@LOSANGELES.AF.MIL

For the Georgia Field Office (GFO) at Warner-Robins, GA call (478) 926-3288 or DSN 468-3288. Email: johnny.walker@ROBINS.AF.MIL

For the Readiness Management Division (RMD) at Fort Monmouth, NJ call (732) 532-4733 or DSN 992-4733. Email: james.buggy@mail1.monmouth.army.mil.

Who to call?

For new technical installation advice, new product information (DAGR, GRAM) technical test reports and acquisition support planning, call TMD.

For sustainment issues including software support, supply support, technical publications, accessory procurement and training, call GFO.

For fielding, equipment authorizations, host vehicle installation assistance and New Equipment Training, call RMD

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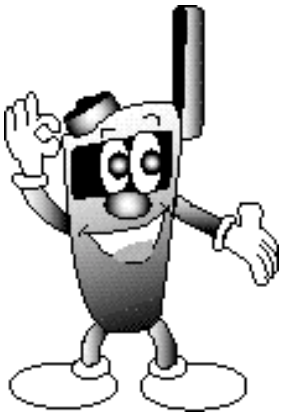

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